

Carbon Nano-Tube (CNT) Reinforced COPV

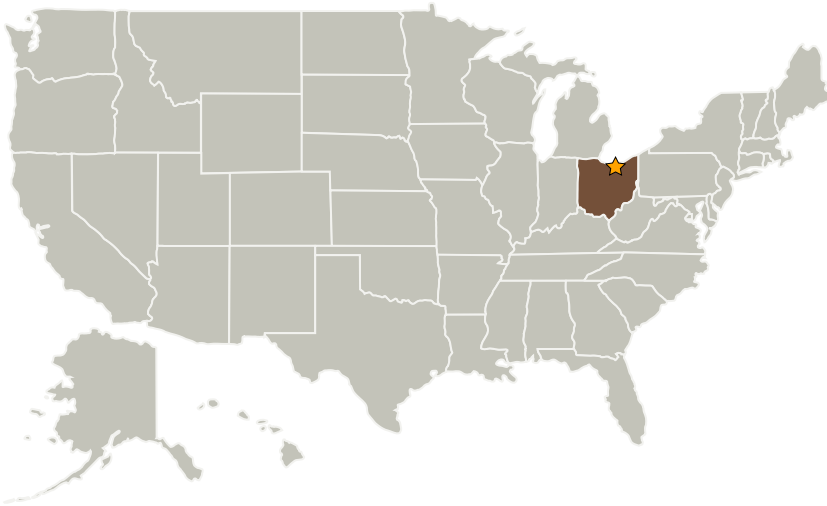
Completed Technology Project (2012 - 2018)



Project Introduction

NASA Funded: Reduced COPV mass for small satellites. NASA Unfunded: This item does not benefit any NASA unfunded or planned missions. OGA: Reduced COPV mass for small satellites. Commercial: Reduced COPV mass for small satellites. Nation: This item does not benefit the nation

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Ohio

Project Transitions

**October 2012:** Project Start

Carbon Nano-Tube (CNT)
Reinforced COPV

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Game Changing Development

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**January 2018:** Closed out

Closeout Summary: Successfully fabricated and flight tested a CNT fiber reinforced COPV as part of a multiexperiment payload on a Subtec 7 Black Brandt Sounding Rocket at WFF on May 16, 2017. This was the first example of a flight test of a CNT reinforced composite structural component and elevated the TRL of these composites to 7. The project did not meet the threshold goal (85%) of its COPV Liner Burst Strength and only achieved a level of 83%. All other KPPs were met. TRL advanced to 7. The objective of this project was to develop and mature high payoff nanotechnologies for future NASA mission with a focus on technologies that could lead to significant reductions in vehicle weight and improvements in performance. The project successfully developed high strength carbon nanotube composites and, for the first time, demonstrated them in a load-bearing component (composite overwrap pressure vessel) that was flight tested on a sounding rocket as part of a cold-gas thruster system. The project also developed polyimide aerogel insulation for electrical wiring that is 90% lighter than conventional polymer insulation and carbon nanotube and metal nanolattice cores for composite sandwich structures with properties that exceeded those of conventional aluminum honeycomb cores at the same density. Launched in May 2017 on a suborbital flight from WFF.

Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Project Management**Program Director:**

Mary J Werkheiser

Program Manager:

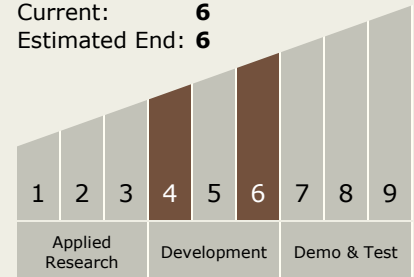
Gary F Meyering

Principal Investigator:

Azlin Biaggi-Iabiosa

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6

**Target Destination**

Earth